AMENDMENTS TO THE CLAIMS:

The following listing of claims replaces all prior versions and listings of claims in this application.

LISTING OF CLAIMS:

1-13.　(Canceled)

14.　(Currently Amended)　A pattern-detection apparatus that detects a specific pattern contained in an image, said pattern–detection apparatus comprising:

a binarizing unit that binarizes an input image data to obtain binary image data,

a partial-image recognition unit that recognizes a partial image being contained in said binary image data and being part of said specific pattern, and

a specific pattern determination unit that determines said specific pattern contained in said image, based on the recognition results obtained by said partial-image recognition unit,

wherein said partial-image recognition unit recognizes a partial image contained in said binary image data, for a pixel-block area having a predetermined size and containing a target pixel in said binary image data, based on at least one of: the conditions concerning the pixels at the opposite vertices, conditions concerning the pixels on the outermost lines of said pixel-block area, and conditions concerning the pixels on the opposite sides on the outermost lines of said pixel-block area.

15. (Original) The pattern-detection apparatus of claim 14, wherein said partial image is approximately a circular image.

16. (Original) The pattern-detection apparatus of claim 14, wherein said condition for the partial-image recognition in said partial-image recognition unit is the one that the number of OFF-pixels in each pixel pair that is located at opposite vertices is less than 2.

17. (Original) The pattern-detection apparatus of claim 14, wherein said condition for the partial-image recognition in said partial-image recognition unit is the one that the total number of ON-pixels on the outermost lines is not more than a predetermined number, for the pixels on the outermost lines of said pixel-block area.

18. (Original) The pattern-detection apparatus of claim 14, wherein said condition for the partial-image recognition in said partial-image recognition unit is the one that the total number of ON-pixels on the outermost lines is not more than a predetermined number, for the pixels on the opposite sides on the outermost lines of said pixel-block area.

19. (Original) The pattern-detection apparatus of claim 14 having further a low-resolution conversion unit that converts said binary image data obtained by said binarizing unit to binary image data of lower resolution, and said partial-image recognition unit recognizing a partial image for said binary image data converted to lower-resolution image data by said low-resolution conversion unit.

20.   (Currently Amended) A method for detecting a specific pattern contained in an image, said pattern-detection method comprising steps of:

binarizing input image data to obtain binary image data,

recognizing a partial image that is contained in said binary image data, and that is part of said specific pattern and has an empty inside, and

determining said specific pattern contained in said image, based on the recognition results,

said method being characterized in that in the partial-image recognition step, said partial image contained in said binary image data is recognized, for a pixel-block area having predetermined size and containing a target pixel in said binary image data, based on at least one of: ~~the~~ conditions concerning ~~the~~ pixels at the opposite vertices, <u>conditions concerning</u> ~~the~~ pixels on ~~the~~ outermost lines of said pixel-block area, and <u>conditions concerning</u> ~~the~~ pixels on ~~the~~ opposite sides on the outermost lines of said pixel-block area.

21.   (Currently Amended) A computer-readable storage medium that stores a pattern-detection program for detecting a specific pattern contained in an image, said pattern-detection program comprising the steps of:

binarizing input image data to obtain binary image data,

recognizing a partial image that is contained in the binary image data and is part of the specific pattern, and

determining the specific pattern contained in the image based on the recognition results,

wherein in the partial-image recognition step, a partial image contained in said

binary image data is recognized, for a pixel-block area having predetermined size

and containing a target pixel in said binary image data, based on at least one of: the

conditions concerning the pixels at the opposite vertices, the conditions concerning

pixels on the outermost lines of said pixel-block area, and conditions concerning the

pixels on the opposite sides on the outermost lines of said pixel-block area.

22.   (Previously Presented) The pattern detection apparatus of claim 14,

wherein the conditions concerning the pixels are the binary values of the pixels.

23.   (Previously Presented) The method of claim 20, wherein the

conditions concerning the pixels are the binary values of the pixels.

24.   (Previously Presented) The computer-readable storage medium that

stores a pattern-detection program for detecting a specified pattern contained in an

image, of claim 21, wherein the conditions concerning the pixels are the binary

values of the pixels.

25.   (New) The pattern-detection apparatus of claims 14, wherein said

partial-image recognition unit recognizes the partial image contained in said binary

image data, for the pixel-block area having the predetermined size and containing

the target pixel in said binary image data, based on at least two of: the conditions

concerning the pixels at the opposite vertices, conditions concerning the pixels on

the outermost lines of said pixel-block area, and conditions concerning the pixels on the opposite sides on the outermost lines of said pixel-block area.

26.   (New) The method of claim 20, said method being characterized in that in the partial-image recognition step, said partial image contained in said binary image data is recognized, for the pixel-block area having predetermined size and containing the target pixel in said binary image data, based on at least two of: the conditions concerning the pixels at the opposite vertices, conditions concerning the pixels on the outermost lines of said pixel-block area, and conditions concerning the pixels on the opposite sides on the outermost lines of said pixel-block area.

27.   (New) The computer readable storage medium of claim 21, wherein in the partial-image recognition step, the partial image contained in said binary image data is recognized, for the pixel-block area having predetermined size and containing the target pixel in said binary image data, based on at least two of: the conditions concerning the pixels at the opposite vertices, the conditions concerning pixels on the outermost lines of said pixel-block area, and conditions concerning the pixels on the opposite sides on the outermost lines of said pixel-block area.